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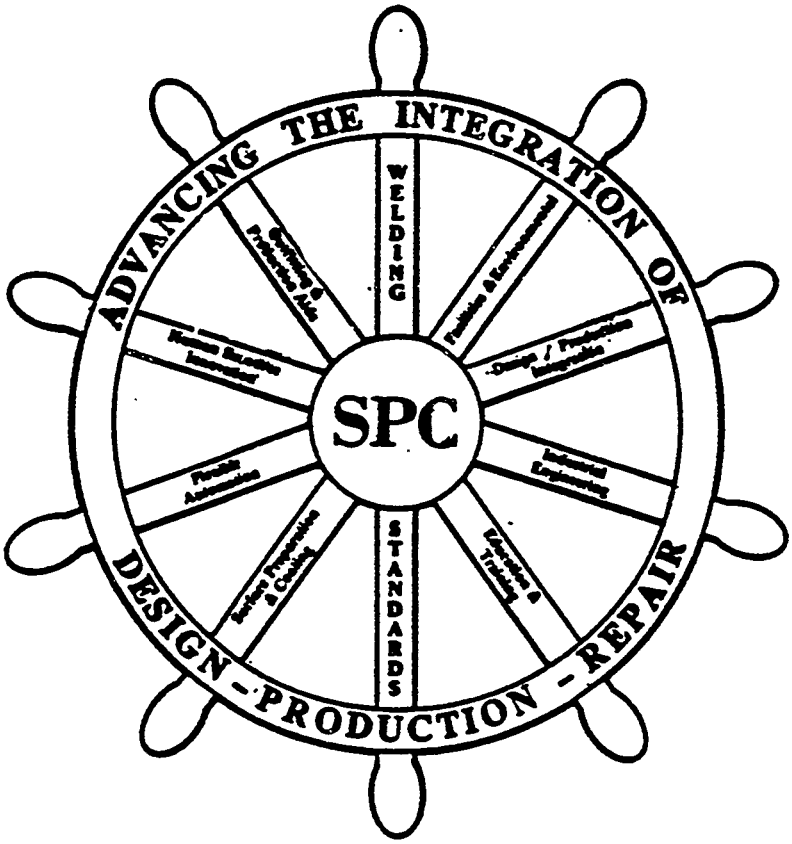

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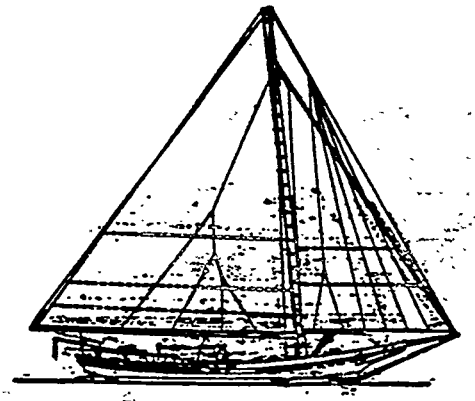

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No. 22

Total Quality Managment (TQM)

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PURPOSE

The purpose of this paper is four folded: (1) To provide a follow-up report to the article "Implementing Total Quality Management (TQM) at Pearl Harbor Naval Shipyard" published in 1988; (2) to document Pearl Harbor Naval Shipyard's TQM strategies after approximately three years of effort; (3) to be used as a vehicle to continuously define, communicate, and improve Pearl Harbor's TQM Roadmap; (4) most importantly, to solicit feedback from inside and outside the Shipyard; this feedback will not only solidify and reinforce ideas and concepts but will also cause reexamination and possible replacement of other TQM elements. Bob King of GOAL/QPC states, "Most organizations do not know where they are going or how they will get there [1]." The challenge is to continuously define, improve, communicate and effectively execute the TQM roadmap.

INTRODUCTION/OVERVIEW

Pearl Harbor Naval Shipyard began implementing TQM in 1986. The initial effort focused on the Deming management method, Statistical Process Control (SPC), and the training of 50 internal SPC Specialists, 800 managers and supervisors, and 5,400 hourly employees. In the last three years, 340 Improvement Teams have been established; which has resulted in a documented savings of 24 million dollars. Consultant costs and training and project-meeting time costs for that same time frame was 18.2 million for a net savings of 5.8 million. In 1989-1990, training costs are expected to decrease, and the number of improvement teams will increase along with net savings. In 1988, with a change of command, the TQM effort continued to grow and expand with the addition of an essential TQM element, Strategic Planning which is a very powerful and essential methodology.

This paper discusses the application of the Deming philosophy and how the ideas of the Japanese Total Quality Control (TQC) concept have been integrated into the Shipyard's TQM effort. Pearl Harbor provides a quality product at the end of overhaul. Quality is a given. The customer will always get a quality product. The problem is at what expense of cost, schedule, and safety. Our challenge is to continuously improve shipyard processes so that we do the right thing right the first time; cost and schedule follow, are predictable, and in control.

TOTAL QUALITY

"Total Quality" includes quality, cost, schedule and safety. "Quality" is defined as meeting the needs of our customers, both internal and external. Quality must always come first. If we cannot hold the gains on quality, cost and schedule will not follow. As Dr. Deming says, "If quality improves, productivity increases and cost decreases [2]." Therefore, areas of opportunity are identified by finding variance with quality, cost, schedule and safety. "Total" means that every department, office, and shop is involved as well as every organizational level and every employee in improving the quality of shipyard processes.

To satisfy the needs of our external customers, the Fleet, operators, and NAVSEA, we must meet the requirements of quality, cost, and schedule. Pearl Harbor's TQM strategy is to meet those needs through continuous improvement of shipyard processes. Each Department/Office/Shop must identify its critical processes, internal customers, quality requirements and then constantly improve the steps in the process. This means reducing rework, waste, errors, time, inspection, redundancy, scrap, etc.

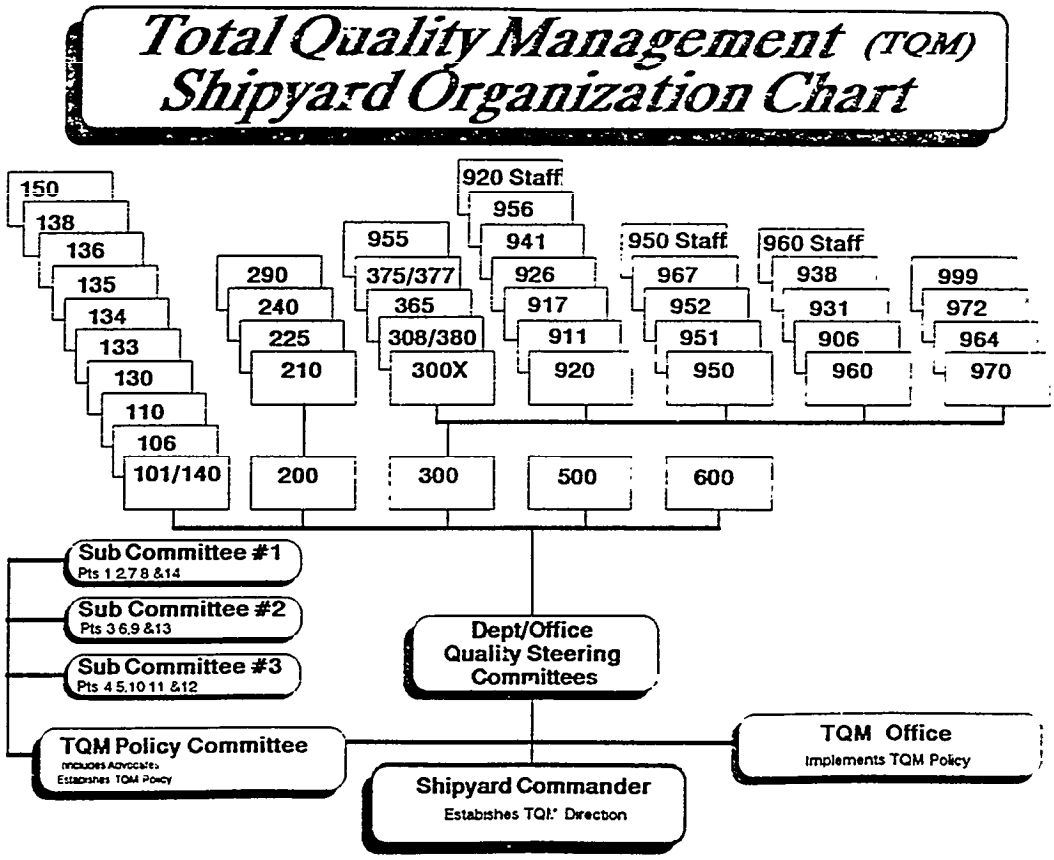

Figure 1. TQM ORGANIZATION STRUCTURE

MAJOR INFLUENCES

TWO philosophies have impacted Pearl Harbor's TQM effort, Dr. Deming and the Japanese concept of TQC. Dr. Deming's philosophy has two components, the Task side and the People side. The Task side is reflected through Principles #3 and #5. Principle #3 states, "Reduce mass inspection by building quality into service and product [3]." A quality service/product comes from a quality process. Therefore, quality improvement comes from process improvement. This expands the focus of problem solving to looking at the entire process that creates the service/product from the design phase all the way to usability of the service/product in the customer's hands.

Principle #5 states, "Constantly and forever improve the quality of product and service [3]." This principle introduces the concept of continuous improvement through the use of statistical methods and the application of thePDCA (Plan-Do-Check-Act) Cycle. PDCA is what Deming gave Japan, the relentless and continuous improvement of product and service. Those that stand still will be surpassed by the competition. The Shipyard's goal is to create an environment where every employee is constantly thinking of ways to improve the way the Shipyard does its business and is actively involved in creating the improvement. TQC promotes Daily, Cross Frictional, and Policy Management. Daily Management focuses on department or vertical quality improvement activities. At Pearl Harbor this is accomplished through the 44 Quality Steering Committees (QSCS) which steer and drive quality improvement efforts in each Department, Office and Shop as shown in Figure 1. Cross-functional activities can occur in three ways. First, Department Heads working in conjunction with their QSC may identify a critical process that needs improvement. Critical processes are selected based on their inability

to meet quality, cost, and schedule requirements and usually cross department boundaries. In this case, a Cross Functional Team is selected to work on these types of processes. Team members are assigned from the Trades and Codes involved in the process. Second, the TQM Policy Committee, under the chairmanship of the Shipyard Commander, may identify critical Shipyard processes that are adversely affecting ship overhaul. These processes have high pay back potential and also include numerous trades and codes. Team members are formed to work on these processes. Third, Cross Functional projects are a part of the many goals and objectives of the Shipyard Operations Plan.

TQM STRATEGIC OBJECTIVES

The following strategic objectives are firmly embedded in the TQM implementation process:

Customer focus.

The concept of customer is at the center of all quality improvement. The customer determines the quality requirements. The external customer's needs of quality, cost, and schedule are met by improving Shipyard processes and meeting the needs of internal customers. In Dr. Ishikawa's words, "The next process is the customer [4]".

Everyone is involved.

For TQM to work, all Departments, all organizational levels and all employees participate. If everyone is involved in improving quality, quality will, in fact, improve. If quality improves, cost decreases and productivity increases.

Leadership and respect for people.

Leaders coach, actively listen, use consensus when appropriate, remove barriers so employees can develop pride of workmanship, promote two way communication, build trust, and provide training, proper tools, equipment, materials, and software.

Making decisions based on facts.

The foundation of quality improvement is based on the use of statistical methods to improve shipyard processes. The Quality Control (QC) Story process provides all improvement efforts throughout the shipyard a step-by-step process to improve quality. A team's ability to follow and learn this process is fundamental to TQM success.

Long range planning.

In order to move away from "crisis management" as an everyday occurrence, the Shipyard must get its many complicated processes in control. This begins by establishing a 5-7 Year Plan. The next step is to develop a 1 Year Plan that includes all the key goals and objectives that are to be met in the coming year.

Finally, to work every day to achieve those goals.

ORGANIZATIONAL STRUCTURE (See Fig. 1)

The following organizational structure provides a framework that decentralizes the quality improvement effort:

Shipyard commander.

Provides top down leadership and serves as a role model, chairs TQM Policy Committee, kicks-off every TQM training class, reviews process improvement presentations twice weekly, makes TQM presentations to outside customers/activities and reviews progress on the 1 Year Goals and Objectives (Shipyard Operations Plan) on a weekly basis.

TOM Policy Committee.

Steers and drives the shipyard TQM effort, develops policy, members are Advocates for the 14 Quality Management Principles, and meets weekly. Continually applies the QC Story process to improve the four TQM components of Policy, Process, Principle and Daily Management.

TOM Office.

Develops, schedules, and contracts for TQM training, works with Code 180 (Training) to coordinate TQM training, schedules, facilitates Process Improvement Team (PIT) presentations to the Shipyard Commander twice weekly, reports quarterly on PIT activity and progress, administers and publishes Shipyard operations Plan (1 Year Goals and Objectives), administers and tracks progress on specific shipyard goal of Implementing TQM", and promotes and publicizes TQM activities/successes.

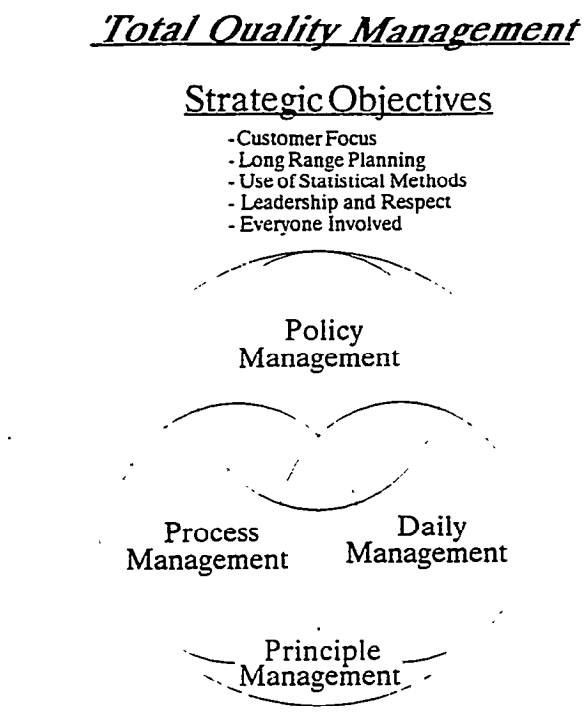

Figure 2. TQM COMPONENTS

Subcommittees (three).

Identify and remove barriers to Deming's 14 Principles. These Principles provide the organizational values necessary for a successful quality driven organization. Each Subcommittee is assigned 4-5 Principles. Subcommittees work directly with the TQM Policy Committee Advocate responsible for each Principle and develop recommendations and POAMS to remove the barriers.

Quality Steering Committees (QSCs).

The line organization is responsible for implementing and institutionalizing TQM. Quality Steering Committees are the most important element in making TQM work in each Department/Office/Shop. There are 44 QSCS in the shipyard at present that steer and make TQM a reality. There are three levels in the Production Department and two levels in the Planning Department. All other Departments/Offices have one level as shown in Figure 1. They make sure their people get TQM training, identify critical processes and establish teams to improve these processes, establish internal suggestion systems and assist their Department/Office Head in making sure Shipyard Operations Plan actions are tracked and completed.

THE FOUR COMPONENTS OF TQM (Figures 2 and 3).

After three years of defining and implementing TQM, four components have evolved. They are Policy, Process, Daily and Principle Management

All four components overlap, are interwoven, and are interdependent with one another.

Policy Management.

Policy Management is the component of TQM that develops constancy of purpose. It establishes long and short range plans that are not affected by managers that come and go. It creates a structure that aligns departments to move together in the same direction to achieve common Shipyard goals that will

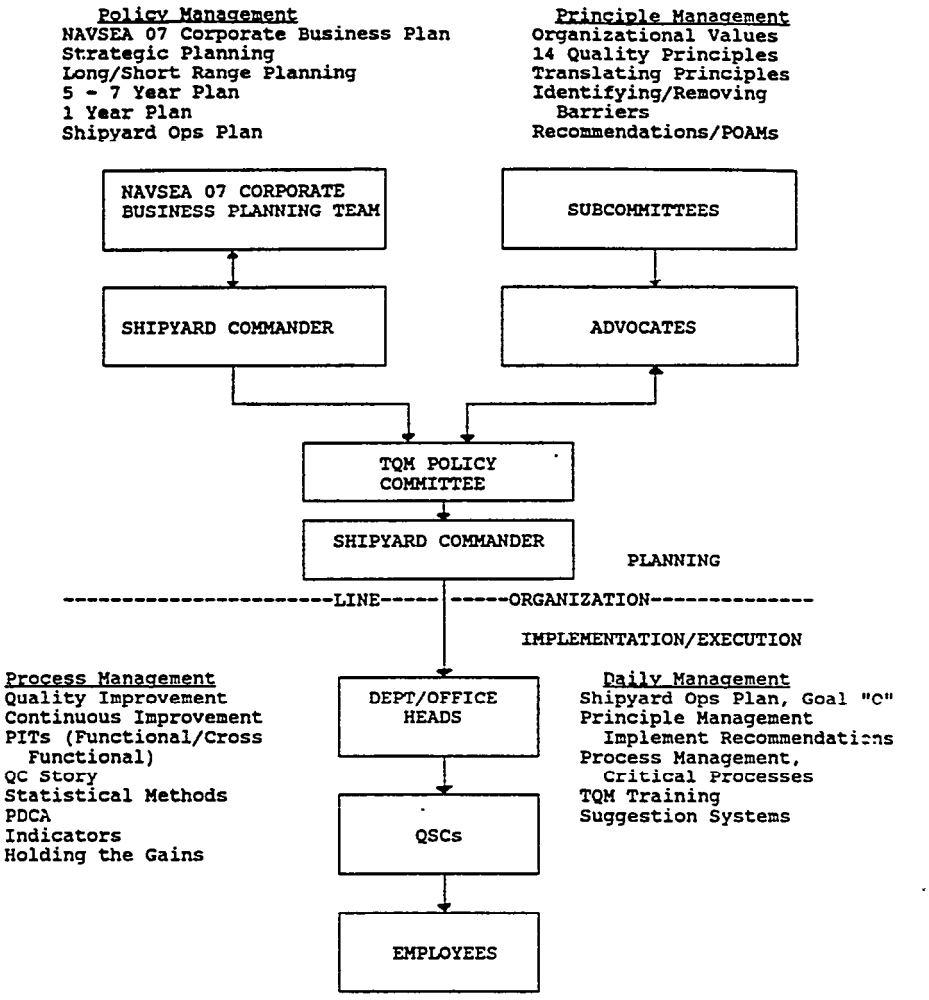

Figure 3. TQM COMPONENT FLOW/INTERACTION

shape the Shipyard of tomorrow. Policy Management incorporates the following methodologies and plans:

NAVSEA 07 Corporate Business Plan
Long Range Planning
Strategic Planning
5-7 Year Plan
1 Year Plan
Policy Deployment
Catchball
Shipyard Operations Plan

The following groups and individuals are involved and responsible for Policy Management as shown:

NAVSEA 07 Corporate Business Planning Team. Develops NAVSEA Strategic Business Plan via environmental scan, identification of key issues, strategies, goals, objectives and contingencies.

Shipyard Retreat Group [Includes TOM Policy Committee). Twenty-one Department/Office Heads, Union Representatives and an outside consultant meet on 4 separate Saturdays during the summer of 1989 to define the 5-7 year and 1 year plan.

Shipyard Commander. Initiates the Policy Management cycle. Conducts weekly, monthly, and quarterly meetings and reviews, as necessary, with Goal Managers. Initiates "catchball" process during deployment phase. Negotiates changes to Shipyard Operations Plan with Goal Managers during review/implementation phase and records those changes for future review meetings. Is a member of the NAVSEA 07 Business Planning Team.

TOM Office. Issues/provides the final Shipyard Operations Plan for each fiscal year. Schedules review meetings, as required with Shipyard Commander approval and distributes schedule.

Goal Managers. Manage their assigned goal. Promote "catchball" process during deployment phase. Negotiate changes with Shipyard Commander and assigned action groups during implementation phase. Track and maintain changes/updates to their goal. Provide copies of changes/updates to shipyard Commander, TQM Office, and action groups involved. Apply QC Story process, i.e., 5 step approach and the use of statistical methods and indicators to achieve goals.

Department/Office/Shop Heads. Work with Goal Manager to achieve goals. Promote "catchball" process during deployment phase. Provides monthly progress reports on all cognizant goal assignments to Goal Manager. Provides quarterly progress reports to Goal Managers and TQM office. Ensure application of QC Story methodology in all aspects of quality improvement, i.e., Shipyard Operations Plan, PITs, QSCS, Daily Management, etc.

Shipyard Operations Plan Action Codes/Shops. Manage and complete actions assigned. Enter into "catchball" process to develop ownership for the actions proposed to achieve the established goals/objectives. Use QC story approach, i.e., 5 steps, statistical methods, and indicators to improve processes and hold the gains.

The Phases of Policy Management include:

5-7 Year Plan. The process to define this plan includes the identification of:

- Key Issue Areas
- Vision Statement (Direction)
- Key Accomplishments (What)
- Strategy (How)
- Goals (l-3 years)

Establish Policy Phase (Starts April 1). This phase begins by reviewing and updating the 5-7 year plan and follows by reviewing the progress of last year's Shipyard Operations Plan. The next step is to define the 1 year goals and objectives that support each strategy. Objectives are more specific than the goals. Goal Managers are assigned followed by the identification of action Department/ Offices/Shops/Codes. When and where possible indicators are established. This phase results in the development of the first draft of what will become the Shipyard Operations Plan.

Deploy Policy Phase (Starts July 1). This phase begins by deploying the goals and objectives down through the various organizational levels. Each level defines the tasks, subtasks, and actions that support the achievement of the goals and objectives. This initiates the "catchball" process which involves operationally defining all the actions required to achieve the goals and objectives. Action Codes/Shops develop ownership in this process by developing actions they believe will best achieve the goals/objectives. It is important in this process that ownership is developed up and down the organization chain and includes negotiation between the various levels involved. Indicators should be finalized at this stage. This phase is completed with the final issue of the Shipyard Operation Plan.

Implement Policy Phase (Starts October 1). Action Departments/ Offices/Shops/Codes have already started preparing to complete their assigned actions as they got involved in the deployment phase. The next step is the review process. Depending on the need, reviews can be held on a weekly, monthly or quarterly basis. The frequency of review is a function of the urgency of the goal and the degree of actions/indicators required to achieve the goal/objective not being clearly defined. The review process is an important managerial discipline that ensures that impediments are removed and that the goals/objectives are achieved.

Process Management.

Process Management involves improving the quality of our Shipyard products and services by improving the processes that create those products and services. Improving quality requires we understand the needs of our customers, both internal and external. It is our customers that determine the quality requirements we want to meet. Two very important methodologies to do this are the QC Story and the Plan-Do-Check-Act cycle. Process Management includes the following methodologies and concepts:

Quality Improvement
Continuous Process Improvement
Critical Processes
Statistical Methods
QC Story
Plan-Do-Check-Act
Focus on Customers
Measurements and Indicators
Holding the Gains

Process Improvement Teams (PITs}. Process Improvement Teams provide a structured environment for employees to work together toward: (1) improving the quality of products and services: (2) developing the skills and abilities of employees; and (3) promoting communication and teamwork. Process Improvement Teams are the basic building blocks of TQM. They consist of three major kinds of teams:

1. Functional Teams. Includes employees from a single functional area or work unit.

2. Cross - Functional Teams. Includes people from more than one functional area to work on improvement opportunities that cut across functional lines.

3. Task Teams. Include members from one or more functional areas, formed to solve a specific problem or group of problems, and then disband. It is a team to which members are selected because of background and experience and are usually tasked by the Shipyard Commander or at the Department Head level.

Critical Processes. Critical processes are defined as those that are critical to the Department/Office/Shop mission and have major variances from total quality. These are the processes that every level of every Department/Office/Shop have identified and are working to improve and have a high potential payback.

QC Story. The QC Story is a standardized structure/process to be used by all those involved in TQM to improve processes. It is a standard way of communicating team progress and a form to help illustrate the steps to be taken by a team in the improvement process. It is used by teams to organize, collect and analyze information, and to monitor how they are doing.

Principle Management.

The 14 Quality Management Principles are the organizational values required to make the quality improvement effort at the Shipyard successful. The principles are divided into two categories; the Task Side and the People Side. The Task Side is focused on quality/process improvement and the use of the QC Story, the PDCA Cycle and statistical methods. The People Side is focused on TQM leadership, respect for people, coaching communication, teamwork, trust, and cooperation. The consultant has stated that only 20% of the total potential quality improvement possible is attainable from just the Task Side. Therefore, the Shipyard must develop its leadership. The Shipyard has made good progress on the Task Side. The area of opportunity is on the People Side.

As shown in Figure 1, there is an organizational structure established to remove the barriers to the 14 principles. This structure includes:

TQM Policy Committee. The TQM Policy Committee has overall responsibility for managing the institutionalization of the principles. They must ensure that the subcommittees get the support they need and that progress is being made. Further, they must ensure the integration of the efforts to remove barriers by the line organization and the subcommittees.

Advocates. The Advocates are members of the TQM Policy Committee and are assigned specific principles. They are responsible to champion these principles and their translation into the Shipyard. They work closely with the subcommittees and provide the communication link between the subcommittees and the TQM Policy Committee.

Subcommittees. The three subcommittees are staff functions. Each is assigned 4-5 principles and is responsible for the identification of barriers to these principles. They prioritize principles, barriers, and causes and provide recommendations for the removal of barriers through the appropriate Advocate to the TQM Policy Committee. The recommendations become the Shipyard strategies for institutionalizing the barriers.

Line Organization. The Line Organization is responsible for implementing the recommendations passed down from the TQM Policy Committee. Actions taken on these recommendations must be tracked and monitored to ensure improvement is taking place.

This process has been in effect for 2 years and has moved somewhat slowly. The process is under review at the present time to strengthen the communication between the committees and individuals involved.

Daily Management.

Daily Management involves the line or functional organization in the implementation of TQM. This is where the rubber meets the road. You can have all the strategies, methodologies, plans, concepts, and good ideas in the world but they must be put into action by the line organization. Just as the Shipyard Commander and the TQM Policy Committee steer and drive the quality improvement effort at the Shipyard level so does each Department/Office/ Shop Head and their QSC steer and drive quality in their area. This is the last frontier of the TQM implementation process. This is where getting everyone involved takes place. The Quality Steering Committees play a major role in this process and may be established at several levels within the department. Daily Management involves the following activities and responsibilities:

Training. Employees must receive TQM training which includes PH 101, PH 201, PH 401, Leadership, First Line Supervisory and Refresher Training.

Process Management. Critical processes must be identified, improved and monitored. Application of the QC Story and the PDCA Cycle is required. Indicators are to be identified and the gains held. Establishing Functional Teams at the workforce level is the next area of opportunity for the Shipyard.

Policy Management. Shipyard operations Plan actions must be identified and tracked. Indicators must be established and actions completed.

Principle Management. Department/ Office/Shop Heads are responsible for removing the barriers to the 14 Quality Management Principles in their areas. They work closely with their QSC and the TQM Policy Committee and the Subcommittees to ensure all recommendations get implemented. They are encouraged to initiate additional actions to remove barriers that will further the TQM effort.

SPC Specialists. A sufficient number of SPC Specialists must be trained to support the process improvement effort. SPC Specialists assist their department and the Improvement Teams in the proper application of statistical methods. To date, 72 SPC Specialists have been trained over the last 3 years.

Suggest System. Internal suggestion systems are to be put in place in each area. Vital to the success of this effort is to provide timely feedback to the originators of suggestions and to implement suggestions at the lowest level and in a timely manner.

LABOR AND MANAGEHENT AS EQUAL PARTNERS

It wasn't until mid 1987 that top management initiated action to include the Union (Metal Trades Council) as equal partners in the TQM effort. This effort was strongly encouraged by the consulting firm, Process Management Institute (PMI), who had been contracted to assist the Shipyard implement TQM. The Union was invited to attend TQM training which included a two day course, "The New Management Philosophy," and a six day course, "Statistical Methods for Process Improvement." The Union has been encouraged to apply this training in managing their own activities. The Union also sent two representatives to the 1988 GOAL/QPC Conference in Plymouth, Mass. The Union participates on all TQM Committees; this includes the forty-four QSCS, the TQM Policy Committee, the three Subcommittees, and the Ops Plan review process. Weekly Ad Hoc meetings are held between 3 Union and 3 Management representatives to discuss and resolve Union TQM concerns/issues. The Shipyard Commander has issued a letter to all Department Heads stating emphatically that Management and the Union are equal partners in TQM and that all effort must be taken to work with the Union at Department levels. Moreover, the door is open for discussing concerns, and on going dialogue exists between Management and the Union.

CRITICAL MASS

When the TQM consultant, Process Management Institute, arrived in June of 1987 there was considerable dialogue about when the shipyard would achieve critical mass. Critical mass is defined as having institutionalized TQM to the degree that no new Shipyard Commander could come in and eliminate it. Managers and supervisors would be practicing TQM on a daily basis and would understand and have seen the benefits. As this occurs in most organizations the realization becomes that they have only scratched the surface and an even deeper quest for quality improvement results. New incoming Shipyard Commanders would see the results of continuous improvement working and would not want to change this successful trend. Critical mass

was estimated to take 3 to 5 years. The shipyard has still not achieved critical mass. However, critical mass is no longer the issue it once was. There has been acceptance of TQM at the DOD and DON level. The shipyard has spent millions of dollars on TQM training and by the time this paper is published the shipyard will have maintained a continuous TQM trust forward under the leadership of three different Shipyard Commanders. Maintaining momentum and consistency of TQM from one Shipyard Commander to another has become routine. One strong reason for this is that the last two Shipyard Commanders have come from within the shipyard and both have been members of the TQM Policy Committee for at least one to two years previously. They understood the value of TQM and maintained strong leadership in the same direction. The bad news is that Shipyard Commanders have been changing about every year and a half. However, at this point there is so much TQM activity both inside and outside the shipyard that it seems unlikely that the TQM effort will be stopped. The question is at what rate and how effectively will we continue the implementation process?

CONCLUSION

The die is being cast. After three years, the TQM Policy Committee understands the major elements and methodologies necessary to make TQM work in the Shipyard. The implementation process at this juncture is one of execution and continuing to improve and refine that process. There has been good progress in the area of training and the use of statistical methods to improve shipyard and departmental processes. Through the Process Improvement Teams and the Quality Steering Committees most managers have seen and believe in the concept of continuous improvement. Strategic Planning and the Shipyard Operations Plan has become a powerful tool. It has helped the shipyard develop a constancy of purpose, make in roads on long range planning and focus on the right problems. The hardest area is that of leadership. There have been significant positive changes in top managers closest to the implementation process. However, for the most part, middle managers fail to see leadership change or begin to exhibit the managerial behaviors desired.

THE FUTURE

Areas of opportunity for the Shipyard in the coming year include:

- Getting TQM to the waterfront.

Improvement Teams properly applying the QC Story process.

-Making decisions based on facts.

- Functional Teams increasing in number and proficiency.

Instituting leadership and respect for people.

Continuing TQM leadership training and developing indicators to verify improvement is taking place.

- Completing the second cycle of the Strategic Planning process.

- TQM training for First Line Supervisors defined and ongoing. Less mass training and more Just-in-Time training, i.e., putting the "use it or lose it". concept into practice.

- Measurements and indicators defined and used as a regular part of " the PDCA Cycle and process improvement efforts.

- Departmental process improvement efforts start to show progress on improving the quality, cost and schedule of ship DMPs and overhauls.

- The Naval Shipyards working ogether with NAVSEA, networking, exchanging information, and collectively making TQM a reality.

Continuing to look beyond everyday frustration, the resistance to change, blaming those above us for not practicing what they preach, and realizing every incremental step is a step closer to our common goal.

REFERENCES

Conference:

1. Bob King, Conference Presentation, Plymouth, Mass, 1988.

Video:

2. W. Edwards Deming, Roadman for Change.

Books :

3. W. Edwards Deming, Out of the Crisis, Massachusetts Institute of Technology, Center for Advanced Engineering Study, Cambridge, Mass., 1986.

4. Kaoru Ishikawa, What is Total quality control? The Japanese way, Prentice-Hall, Englewood Cliffs, New Jersey, 1985.